

REMARKS

Claim Status

Claims 1-23 are now pending, with claims 1 and 14 being the only independent claims. The specification has been amended. The Abstract has been amended. Claims 1-21 have been amended. Claims 19 and 20 have been placed in independent form. The amendments to claims 1-13, 15-18 and 21 are merely cosmetic or clarifying in nature. Dependent claims 22 and 23 have been added. No new matter has been added. Reconsideration of the application, as herein amended, is respectfully requested.

Information Disclosure Statement

The Examiner has indicated on the Form 1449A ("Information Disclosure Statement by Applicant") attached to the Office Action that the references EP 0 741 471, G. Scheets et al., "Analyzing end-to-end delivery delay in pure VoIP networks", Psytechnics Ltd., "Estimating E-model Id within a VoIP network", and Frédéric Le Garrec, "Deliverable D2.4 The needs of Consolidation" listed on the Information Disclosure Statement (IDS) filed on July 3, 2006 were not considered. (A line is drawn through each reference.) A new IDS is being filed concurrently herewith to resubmit these references for consideration. Entry and acknowledgment that the new IDS and the references cited therein have been entered and considered is requested.

Overview of the Office Action

The specification has been objected to because of minor informalities. Withdrawal of this objection is in order, as explained below.

The Abstract has been objected to for certain informalities. Withdrawal of this objection is also now in order.

Claim 14 stands rejected under 35 U.S.C. 112, second paragraph, as indefinite for failure to particularly point out and claim the subject matter which applicants regard as the invention. Withdrawal of this rejection is also in order, as explained below.

Claims 1-12 and 14-21 stand rejected under 35 U.S.C. §101 as directed to non-statutory subject matter. Withdrawal of this rejection is in order, as also explained below.

Claims 1, 4-8, 10-12, 14, 16, 19 and 20 stand rejected under 35 U.S.C. §102(b) as anticipated by WO 2001/045291 (which corresponds to U.S. Patent No. 7,304,962) ("*Kirla*"). Claims 2 and 15 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Kirla* in view of U.S. Patent No. 6,795,452 ("*Iancu*"). Claims 3 and 5 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Kirla* in view of U.S. Patent No. 5,708,704 ("*Fisher*"). Claim 9 stands rejected under 35 U.S.C. §103(a) as unpatentable over *Kirla* in view of U.S. Patent No. 6,272,539 ("*Cuomo*"). Lastly, claims 13, 17 and 18 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Kirla* in view of U.S. Patent No. 6,370,163 ("*Schaffer*").

Applicants have carefully considered the Examiner's rejections, and the comments provided in support thereof. For the following reasons, applicants respectfully assert that all claims now pending in the present application are patentable over the cited art.

Descriptive Summary of the Prior Art

Kirla discloses "a method of providing information of the echo path of a speech connection in a Packet Data Network" (see pg. 1, lines 5-8).

Iancu discloses a "method for tracking time intervals of a communication signal" (see col. 1, lines 6-7).

Fisher discloses a "system and method for providing prompt interrupt capability in a voice activated telephone based system" (see col. 2, lines 25-27).

Cuomo discloses “methods, systems and computer program products for determining network delay and visually representing such information to users of collaborative network applications” (see col. 5, lines 8-11).

Schaffer discloses “a system and method for adaptive packet-length speech transport over a data network based on end-to-end transmission delay” (see col. 2, lines 15-20).

Summary of the Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The specification discloses a method and system for evaluating the processing delay of a speech signal. In accordance with the claimed invention, at least two steps (i) and (ii) are performed in parallel in the receiver terminal to evaluate the speech signal processing delay (see paragraphs [0128] to [0142] of U.S. Publication No. 2006/0277051 (the instant specification))

With reference to FIG. 2, in the first step (i), the network filter (105) obtains a stream of audio packets (e.g., RTP packets) from the data packets (e.g., UDP packets containing RTP packets) received by the receiver terminal via the network interface (101) and the protocol stack (103). The stream of audio packets is provided to the control decoder (123) which decodes the audio packets to reconstitute a first speech signal (F1) within a predetermined decoding time.

In the second step (ii), the telephony module (107) uses the decoder 107b to extract the audio packets (i.e., the RTP packets) from the data packets (i.e., the UDP packets) delivered by the protocol stack (103) and reconstitutes a speech signal. At least a portion of the speech signal reconstituted by the telephony module is duplicated by the audio filter (111) and a second speech signal (F2) is also reconstituted.

The processing delay evaluation module 131 is used to determine the time delay or time difference between the first and second speech signals. The processing delay of the speech signal received in the receiver terminal is then calculated at the processing delay evaluation module 131 based at least on the determined time difference between the first and second speech signals (F1, F2) and the predetermined decoding time of the control decoder (123). More specifically, the delay D3, representing the processing delay of the speech signal received in the receiver terminal, is obtained by summing the determined time difference between the speech signals (F1, F2) and the predetermined decoding time of the control decoder (123) (see paragraph [0142] of the instant specification).

As explained at paragraphs [0016] and [0117] of the instant specification, the determined time difference between the speech signals F1 and F2 accounts for the processing delay of the stream of audio (RTP) packets that exits the network filter (105) and is processed by the telephone module (107) and the control decoder module (123). The processing delay of the control decoder module (123) and the decoder (107b) is substantially identical. Consequently, the determined time difference represents the cumulative delay introduced by the buffer 107a and the signal processing unit 107c, which is inherently variable and therefore difficult to measure directly.

The claimed method and system thus provide a way to evaluate the processing delay of a speech signal in a receiver terminal connected to a packet-switched network non-intrusively, i.e. during real-time calls. It thus becomes possible to evaluate the perceived voice quality of speech that is received by a telephone terminal user.

Amendments Addressing Section 112 Issues and Formalities

The Examiner (at pg. 2 of the Office Action) has stated that “[a] substitute specification is required ... because the changes to the specification were not filed in another marked up version as well as a clean version”. In response to this requirement, applicants have prepared and enclose herewith the required substitute specification and marked up version, supported by an accompanying Certification. No new matter has been added. Entry of the substitute specification is requested.

The Examiner (at pgs. 3 and 4 of the Office Action) also objected to the length of the Abstract of the Disclosure. In response, applicants have enclosed herewith an amended Abstract that addresses the objection in a self-explanatory manner. The Abstract as amended herein is now properly narrative in form, limited to a single paragraph and is within 50 to 150 words. Withdrawal of the objection to the Abstract is deemed to be in order.

The Examiner has stated that “the term ‘delay difference’” in claim 14 “is vague and nondescript as it does not specifically refer to any of the disclosed delay values”.

In response to this rejection, applicants have amended independent claim 14 to now recite, *inter alia*, “means for determining a time difference between the first speech signal and the second speech signal”.

Applicants’ specification discloses that the delay or time difference between the first and second speech signals is determined (see step E39; FIG. 2) by the processing delay evaluation module (131), and represents the time shift between the two signals F1 and F2, the time shift resulting from the cumulative delay introduced by the buffer 107a and the signal processing unit 107c, when processing the stream of audio packets. The claim recited delay or time difference is therefore supported by the specification and its meaning is, thus, clear.

Withdrawal of the 35 U.S.C. §112, second paragraph rejection is thus deemed to be in order.

Patentability of Independent Claims 1, 14, 19 and 20 under 35 U.S.C. §101

The Examiner (at pg. 3-4 of the Office Action) has stated that:

All of the claims cite the calculation of a processing delay but each claim lacks an output or functional change to satisfy 35 U.S.C. 101. The claims must recite an output or transfer to a function part such that the delay is useful, tangible, and concrete.

...

Claims 19 and 20 of the claimed invention are directed to non-statutory subject matter. Both claims cite the use of an "information medium".

In response to the foregoing, applicants have amended independent claim 1 to now recite, *inter alia*, "calculating the processing delay of the speech signal contained in the data packets received in the receiver terminal from at least the determined time difference between said first and second speech signals and the predetermined decoding time to evaluate the processing delay of the speech signal in the receiver terminal". Independent claim 14 has been correspondingly amended. Independent claim 1 as thus amended is accordingly limited to a practical application that produces a useful, tangible and concrete result, i.e., evaluating the processing delay of the speech signal in the receiver terminal.

Applicants have also amended independent claims 19 and 20 to place them in independent form, such that claims 19 and 20 now recite a computer readable medium encoded with a computer program executed by a computer that causes evaluation of a processing delay of a speech signal contained in data packets received in a receiver terminal during a voice call to a terminal sending said data packets over a packet-switched network. Independent claims 19 and 20 now also recite that the computer program includes program code for executing each corresponding method step of independent claim 1.

In view of the foregoing, independent claims 1, 14, 19 and 20 as now amended are clearly directed to statutory subject matter; reconsideration and withdrawal of the rejection under 35 U.S.C. §101 are accordingly deemed to be in order, and notice to that effect is requested.

Patentability of the Independent Claims Under 35 U.S.C. §102(b)

Independent claims 1 and 14 have been amended to clarify the salient features of the claimed invention. In particular, independent claim 1 has been amended to recite “the receiver terminal having a telephony module which generates a reconstituted speech signal from the received data packets”. Independent claim 1 thus now includes antecedent basis for the step of “duplicating at least a portion of the speech signal reconstituted by the telephony module to reconstitute a second speech signal” which is recited in independent claim 1.

In addition, independent claim 1 has been amended to recite the step of “obtaining, from the received data packets, a stream of audio packets and decoding the audio packet stream within a predetermined decoding time to reconstitute a first speech signal”. Independent claim 14 has been correspondingly amended. Thus, independent claims 1 and 14 have been amended to clarify that the signal is provided (i.e., generated) by the telephony module, and is duplicated to create a second speech signal. No new matter has been added.

The Examiner (at pg. 6 of the Office Action) asserts that:

Kirla discloses:

- obtaining from the received data packets a stream of audio packets containing the speech signal
- [Kirla, column 5, lines 38-45] discloses “FIG. 1 shows a detailed block diagram of an echo removing device 18 such as an echo canceller or an echo suppressor being integrated into a gateway apparatus GW between a Switched Circuit Network SCN and a Packet Data Network PDN. Such a gateway apparatus typically comprises speech decoding means 11, 11’, speech encoding means 12, 12’, packetizing means 1, receive jitter buffer means

19, and an echo canceller.” The gateway receives data packets containing the speech signals in the de-packetizer 19 which receives the packets and buffers them for decoding.

Applicants disagree.

Kirla (pg. 4, lines 12-15) explains that “there is a need for an alternative estimation of the echo round-trip delay for a windowed echo canceller and an echo suppressor, if a packet network connection is present in the echo path”. *Kirla* (pg. 9, lines 28-31) additionally explains that the delay measurement system in a packet network is especially applicable for enhancing the operational capabilities of echo cancellers or echo suppressors. *Kirla* thus discloses a method for obtaining improved “speech quality, a faster convergence and a more efficient implementation of an echo canceller or an echo suppressor” (see pg. 9, lines 31-35), and *Kirla* is accordingly directed to solving a problem that differs from that of the claimed invention, i.e., *Kirla* is directed to estimating the echo round trip delay for a windowing echo canceller and an echo suppressor, where a packet network connection is present in the echo path to optimize performance of the echo removing device. In seeking to achieve this desired result, *Kirla* (FIG.1) teaches that a delay measurement system is implemented in a gateway apparatus (GW) between a Switched Circuit Network (SCN) and a Packet Data Network (PDN).

In contrast, applicants’ claimed invention is directed to determining end-to-end transmission delay to evaluate the quality of voice calls over a packet-switched network. The method of now-amended independent claim 1 recites, *inter alia*, “evaluating a processing delay of a speech signal contained in data packets received in a receiver terminal during a voice call to a terminal sending said data packets over a packet-switched network, the receiver terminal having a telephony module which generates a reconstituted speech signal from the received data packets”. That is, the delay that is evaluated is the processing delay of a speech signal contained in data packets received in a receiver terminal, during a voice call or communication between the

receiver terminal and a sender terminal. Independent claim 1 additionally recites the step of “calculating the processing delay of the speech signal contained in the data packets received in the receiver terminal from at least the determined time difference between said first and second speech signals and the predetermined decoding time to evaluate the processing delay of the speech signal in the receiver terminal. *Kirla* fails to teach this step, as well as the corresponding recitations of now-amended independent claim 14.

As explained at paragraph [0106] of applicants’ instant specification, the same received data packets – which are provided by the protocol stack 103 depicted in FIG. 2 – are processed (in parallel) by (i) the network filter module 105 and the control decoder module 123 to obtain and decode a stream of audio packets to reconstitute a “first speech signal”, and by (ii) the telephony module 107 to provide a “speech signal reconstituted by the telephony module”. Here, it bears noting that the network filter module 105 is transparent with respect to the telephony module (see, e.g., paragraph [0106] of the instant specification). Next, at least a portion of the “speech signal reconstituted by the telephony module” is duplicated by the audio filter module 111 to constitute a “second speech signal” F2. *Kirla* fails to teach or suggest a system that encompasses these claimed features as recited in now-amended independent claim 14, as well as the corresponding steps recited in now-amended independent claim 1.

In *Kirla*, the delay measurement system is implemented in a gateway apparatus (GW) which is not a receiver terminal within the meaning and scope of the claimed invention, i.e., the gateway apparatus of *Kirla* is not telephone terminal equipment, such as an IP terminal. Based on the Examiner’s proffered analysis of *Kirla*, the gateway of the decoder 11 depicted in FIG. 1 allegedly comprises applicants’ claimed “telephony module” of independent claims 1 and 14, and the decoder 11’ allegedly comprises applicants’ claimed “control decoder module” of independent claim 14. The Examiner’s proffered analysis fails.

Kirla (pg. 10, line 32 to pg. 11, line 1; FIG. 1) explains that an echo removing device 18, such as an echo canceller or an echo suppressor, is integrated into a gateway apparatus (GW) between a Switched Circuit Network (SCN) and a Packet Data Network (PDN). *Kirla* (pg. 11, line 1-4) additionally explains that the “gateway apparatus typically comprises speech decoding means 11, 11’, speech encoding means 12, 12’, packetizing means 13, receive jitter buffer means 19, and an echo canceller”. *Kirla* thus teaches that the pair of decoders 11, 11’ in the gateway receive and process data packets from distinct, independent sources: decoder 11’ receives packets from the switched circuit network (SCN near-end), and decoder 11 receives packets from the packet data network (PDN far-end). Thus, in addition to the use of the gateway in *Kirla*, which differs from the telephony module recited in now-amended independent claims 1 and 14, the pair of decoders 11, 11’ included in the gateway cannot perform the steps of the method recited in now-amended independent claim 1. Moreover, the signals provided by the decoders 11, 11’ of *Kirla* do not provide the reconstituted first and second speech signals of now-amended independent claims 1 and 14. Independent claims 1 and 14 are therefore patentable over *Kirla* for at least these reasons.

Independent claims 19 and 20 each define a computer-readable information medium encoded with a computer program comprising program code associated with the claimed method of independent claim 1. Independent claims 19 and 20 are therefore likewise deemed to be patentable over *Kirla* for at least those reasons discussed above with respect to independent claims 1 and 14.

In view of the foregoing, amended independent claims 1, 14, 19 and 20 are not anticipated by *Kirla*. Reconsideration and withdrawal of the rejection of claims 1, 14, 19 and 20 under 35 U.S.C. §102 are thus deemed to be in order, and early notice to that effect is solicited.

Moreover, by virtue of the above-discussed differences between the recitations of claims 1, 14, 19 and 20 and the teachings of *Kirla*, and the lack of any clear motivation for modifying *Kirla* to achieve applicants' claimed invention, independent claims 1, 14, 19 and 20 are likewise deemed to be patentable over *Kirla* under 35 U.S.C. §103.

Patentability of Dependent Claims 2, 3, 9 and 13 under 35 U.S.C. §103

The Examiner (at pg. 18 of the Office Action) acknowledges that *Kirla* fails to disclose “the measured delay difference between said first speech signal and said second speech signal is measured by intercorrelation of the envelope signals of said first and second signals,” as recited in dependent claim 2, and cites *Iancu* for this feature.

The Examiner (at pg. 20 of the Office Action) also acknowledges that *Kirla* fails to disclose “determining the delay difference is preceded by a step of detecting vocal activity in the first and second voice signals, the subsequent steps being executed if the vocal activity detected in the first and second signals is above a predetermined threshold,” as recited in dependent claim 3, and cites *Fisher* for this feature.

The Examiner (at pg. 21 of the Office Action) has additionally acknowledged that *Kirla* fails to teach, *inter alia*, “the send processing delay D1 of the speech signal is evaluated by consulting a table stored in the receiver terminal containing a predefined maximum value and a predefined minimum value of said delay D1 for each type of speech signal send coder, said predefined values taking into account the payload of the IP packets received.” as recited in dependent claim 9, and cites *Cuomo* for this feature.

The Examiner (at pg. 23 of the Office Action) also acknowledges that *Kirla* fails to teach, *inter alia*, “creating information representing the end-to-end delay values obtained,” as recited in dependent claim 13, and cites *Schaffer* for this feature.

Applicants, however, contend that no combination of *Kirla*, *Iancu*, *Fisher*, *Cuomo* and/or *Schaffer* achieves the subject matter of independent claim 1, from which claims 2, 3, 9 and 13 depend. There is simply nothing in *Iancu*, *Fisher*, *Cuomo* and/or *Schaffer* to cure the above-discussed deficiencies in *Kirla*, e.g., the lack of teachings relating to applicants' claimed telephony module and/or the signals from which the first and second speech signals are reconstituted, as recited in now-amended independent claim 1.

Iancu discloses a "method for tracking time intervals of a communication signal" (see col. 1, lines 6-7). *Fisher* discloses a "system and method for providing prompt interrupt capability in a voice activated telephone based system" (see col. 2, lines 25-27). *Cuomo* discloses "methods, systems and computer program products for determining network delay and visually representing such information to users of collaborative network applications" (see col. 5, lines 8-11). *Schaffer* discloses "a system and method for adaptive packet-length speech transport over a data network based on end-to-end transmission delay" (see col. 2, lines 15-20).

Iancu, *Fisher*, *Cuomo* and *Schaffer*, however, fail to teach or suggest anything whatsoever with respect to the claimed telephony module and the signals from which first and second speech signals are reconstituted, as in now-amended independent claim 1. Each of the cited references thus fails to teach or suggest the express recitations of applicants' independent claim 1. Since *Kirla*, *Iancu*, *Fisher*, *Cuomo* and *Schaffer*, individually or in combination, fail to teach or suggest the features recited in independent claim 1, dependent claims 2, 3, 9 and 13 are deemed to be patentable based at least on their dependency from claim 1.

Dependent Claims

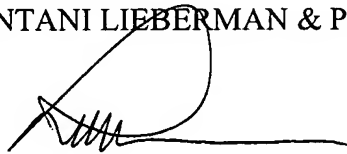
In view of the patentability of independent claims 1, 14, 19 and 20 for the reasons presented above, each of dependent claims 2-13, 15-18 and 21, as well as new dependent claims 22 and 23, is respectfully deemed to be patentable therewith over the prior art. Moreover, each of these claims includes features which serve to still further distinguish the claimed invention over the applied art.

Conclusion

Based on all of the above, applicants submit that the present application is now in full and proper condition for allowance. Prompt and favorable action to this effect, and early passage of the application to issue, are solicited.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate an early resolution of any outstanding issues.

Respectfully submitted,
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